

(3)

A

TREATISE
ON THE
TEETH;
THEIR
DISORDERS
AND
CURE.

In which the several Operations on the TEETH,
and such Things as are found destructive to
them, are particularly considered.

Translated from the original *Latin* of
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ERRATA.

Page 19, *for* Molary, *read* Molares.
27, *for* Spasmatic, *r.* Spasmodic.
29, *for* Senex, *r.* Sennertus.



OF THE
T E E T H;
THEIR
D I S O R D E R S
AND
C U R E.

***** S there is no constituent Part of
A the Human Machine which does
not carry in it the clearest Evi-
***** dences of the Wisdom and Good-
ness of the adorable Maker; so must the
Teeth, in their Nature, Order, and Struc-
ture, be acknowledged not the least won-
derful Work of God: What is chiefly re-
markable in their Nature, is their Solidity
and Duration; in which they far surpass all
the other Parts of an Animal; whence, ac-
B cording

according to *Tertullian*,* it was an ancient Opinion that the Teeth lay in the Earth for thousands of Years, as so many Seeds for renewing the Body at the Resurrection, of which more may be seen in *Galen*. † Likewise when we view their exact Order and Arrangement in the Jaw, we cannot but admire the Contrivance of a most provident and sagacious Nature, in placing them so that the upper and lower may meet, and yet not all of them at the same Time, that the Alternative of cutting and grinding the Food, may be duly performed; for when the Grinders meet, the upper Fore-Teeth project over the lower, and when the Fore-Teeth are employed, there is an open Space betwixt the Grinders; thus is there a Succession of Rest and Action throughout the whole Set. This admirable Disposition *Galen* long since alledged, as a sufficient Confutation against those rash Blasphemers of Nature, who ascribed all its wonderful Operations to so mean an Origin as a fortuitous Concourse of Atoms.

The Beauty and exceeding Usefulness of this Organ, or microcosmic Mill, without which, the Mastication of Food, so necessary to long Life, cannot be duly performed, have induced me to a further Investigation of their Nature, Structure, Connection,

* De Resurrectione. † De Ossibus.

nection, and Use, and to shew their Disorders, with the Causes and Remedies thereof.

Without dwelling on any elaborate and prolix Enquiry into the Etymology of the Name, I shall immediately enter upon this Definition of them. Teeth are boney Parts of the Body, consisting of two Substances; the one, from its Hardness, may be compared to Stone; the other, tho' softer, is boney, partly hollow within, and inserted in the *Alveoli* or Sockets of the Jaws, as Nails drove into Wood; their Use is for Mastication and Speech, at the same Time that they are a most beautiful Ornament. First, it is to be observed that the Substance of the Teeth is two-fold; the one external, which with the Hardness of a Stone, has, nevertheless, nothing of its Nature, as appears from the Experiment of laying a sound human Tooth in *Aqua fortis*, where it dissolves in a few Hours to a glutinous Substance, which appears to be the sulphureous and oily Part of the Tooth; this Solution being saturated with Oil of Tartar, per deliquium, produces a Magistery of the same medical Virtues, as that of a wild Boar's Tooth, or the Hoof of an Elk, whereas Flints and real Stones admit of no such chymical Process. This outward Substance of the Teeth is so firm and hard, that it resists the most violent Attrition, and

under the Hammer plentifully emits Scintillations ; but this is to be understood only of the Grinders of the larger Beasts, whose Bigness increases their Resistance; this hard stony Substance of the Teeth is visible only in that Part of them which stands out of the Gums, and serves as a Cortex or Tegument to the bony Part; for the Roots of the Teeth, which are hid within their Sockets, and under the Gums, being only a boney Substance, have neither the Whiteness, Firmness, nor Polish of the Part which appears in Sight; this outward Part stands in Need of all its Hardness, to secure the inward from any Damages, and for the better cutting and grinding the more solid Foods; the inward boney Substance therefore being of a more lax Texture, and thus easier dissolved and wasted, is provided with an outward harder *Lamina* or *Cortex*, as a Safeguard against the corrosive Particles of some Aliments, which otherwise might prey upon and utterly destroy it; for in a *Caries* it is here where the Damage lies, the compact Cortex being very seldom, and only in some small Part, injured by any Corrosive. Lastly, the outward Cortex of the Teeth differs from the inward in the Structure, the Striæ of the former terminating in small oblique Circles; whereas the inward and softer Part is composed of a Multitude of fibrous vertical Strata, both
which

which are manifest in Bones, after a long Maceration, when reticular Laminæ may be peeled off intire. What *Malpighi* has on this Head * is well worth reading.

In the Definition it has been said, that the Teeth are partly hollow within, and such a Cavity appears very plainly, upon cutting a Tooth longitudinally through the Middle; nay each distinct Root of a Tooth is seen to have a Cavity, which is still more apparent in the Basis, or that Part which dilates the Gums. For this Cavity of the Tooth is, in all Animals universally, found to contain a mucous membranous Substance, or a mucous Film in the Form of an oblong Bladder, consisting of very minute Blood-Vessels, Nerves, Membranes, and a glutinous Substance, reaching to the very Extremity of the Tooth, where it becomes harder and redder by the increased Tenseness of its Membrane. This Cavity *Eustachius* says, is largest in Fœtuses and Boys, with a thin Scale over it, and not unlike a Honey Comb till the Seventh Year, but in Adults it contracts. In Boys this Cavity is full of a mucous Matter within a Membrane of a red Surface, but the Inside appears white, and this Mucus is the very alimentary Principle of the Teeth, and in Time hardens into their Substance ;
for

* Anatome Plant. p. 19.

for it is seen, that the Substance of the Teeth consolidating as in Adults, this Mucus diminishes and abounds most in Infants, their Teeth consisting only of softish *Laminae*. In Calves Teeth, and especially in that called the *Sweet-Tooth*, this mucilaginous Matter is obvious to the naked Eye, and if the Blood-Vessels, which are here and there discernable by reddish Streaks, be compressed, they plainly discharge a Mucus.

I now proceed to a more narrow Inspection into the Generation and Formation of the Teeth; and the first Observation, which offers here is, that the Teeth, like the other Parts of the Body, receive their Elements and Formation in the Womb. *Eustachius*, the curious Eye Witness of the amazing Circumstances of this Truth, tells us, that he opened the Jaws of many Fœtuses, abortive and full grown, and plainly distinguished the *Incisores*, the *Canini*, and three Grinders, soft and separated by a very thin boney Inclosure, and in each a very fine mucous, glutinous *Lamina*, perforated at the Extremity, for the Point of the Tooth to shoot; and after removing this *Stratum*, he came to another, still more minute, being the Fund prepared to supply the Loss of the former. *Vesalius* † certifies, that the hinder
Teeth,

† De Corp. hum. l. i. cap. 13.

Teeth, by the Learned called *Dentes Sapientiae*, have been found within the Skulls of dead Persons; and to the same Purpose, is what *Columbus* says, † that in abortive Children, of seven or eight Months, and in Infants dying in their Birth, he has so plainly discovered small Teeth in their Sockets, as even to take them out. This is an undoubted Proof, that when any Teeth are bad, there is not a new Creation of others, but only those of the hidden *Stratum* supply the Vacancies of the former; so that the common Saying, when Men in their old Age breed Teeth, be it with or without Pain, that their Teeth are again engendred, is a meer Fable. † This is further worthy of Notice, that the *Incisores*, or cutting Teeth, especially in Fœtuses, have a white Scale or *Lamina*, of some Firmness, whereas that of the *Canini* is both less and softer, and that of the *Molares* or Grinders, may be compared to very thin Paper; wherefore it is not to be wondered at, if they do not all reach their full Growth and Solidity at one Time, but shoot out according to the Formation of their Principles in the Womb. *

The

† L. I. cap. 10. † M. N. C. Dec. II. anno IV. p. 73. *Schenck*. Observ. Med. p. 215. *Laurence*. Anat. p. 728. *Seibiz*. Disp. de Dent. *Eustachius*. loc. cit. *Bartholine*. Anat. p. 726. *Helmont*, Arcan. *Paracels*. p. 740.

* See *Eyssonius*, de Offibus Infant. cap. 13. p. 51.

The incisive, or cutting Teeth, usually appear in the seventh Month, though sometimes they stay till the tenth, or even a whole Year: The *Canini* shoot in the ninth or tenth Month, and before the Grinders make their Way it is in many two Years; in some, the Upper coming first, in others, the Lower; again each Jaw generally sheds ten Teeth, the four *Incisores*, the two *Canini*, and four *Molares*, of which the fourth, fifth, and sixth Years are the Seasons, and their Places begin to be supplied with a new Set, either about the seventh or fourteenth Year.†

The alimentary Matter has been before said to be a *Mucus*, and this is visible in the Teeth of Boys, but more so in those of Fœtuses, and Abortives, where it is seen to consist of three Parts, a membranous or rather mucous Film, containing the whole Tooth, easily separable from it, and perforated both at the Basis and the Root; a mucous pellucid Root, full of Vessels with a distinguishable Cavity, when squeezed emitting Blood, and in Time becoming more and more osseous, from the Circumference towards the Centre; and lastly a Basis, which is not unlike a white, thin, and excavated Scale.* This mucous and
glutinous

† See farther, in *Bartholine* in Anat. p. 728. *Verbesen*, anat. p. 224, 225. and *Forrest*. 14. Observ. 3. in *Scholiis*.

* *Blasii*, Anatom. Contract. p. 100,

glutinous Matter which is the real Aliment of the Teeth, the Principle from which they wholly derive their Growth, Extension and Solidity ; for that Solids are producible from Fluids is shewn by Experience, the hardest Bones of the Body are formed from the earthy, yet fluid Particles of the Blood ; and every Naturalist knows, that in subterraneous Caverns the Drops of certain Waters harden into Stones. I myself have found by Experiment, common Water, by pouring into it a certain petrifying Liquor, to contract in time a stony Solidity ; and by the same reason it is beyond all doubt that the mucous Matter contained in the Teeth may be, and is, turned into the osseous Substance : But a further and more analogous Demonstration of the Elements of Bones is, that chymical Analysis, which, by means of a *Papinian* (a Digestor, so called from the Name of the Inventor, but considerably improved by myself) not only Bones, but the Teeth also, are in a short Space softened and reduced into a Jelly with a mucous earthy Substance ; for it is most certain that they, like the other Solids of the Body, are of a gelatinous Origin, but of the more gross and earthy kind ; whereas the softer or fibrous Parts consist of a more fluid Gelly, into which all Flesh is reducible by the *Papinian* Digestor. This mucous Aliment of the Teeth

is the Produce of the Blood, and conveyed from the lesser Arteries along Tubes of amazing Minuteness, rising from the external *Carotides*, through the Pores of the Teeth. It has been before noticed, that this *Mucus* found in the Teeth is contained in a firm Tegument, full of Vessels and Ramifications for the Conveyance and Reception of the Blood. This Tegument no where appears so red as in the lower part of the Cavity of Beasts Teeth; hence it is clear, why a sanguinolent Serum is often found to ooze, or may by Suction be drawn out of a carious Tooth, the Blood Vessels reaching within the Cavity of the Teeth. I am therefore inclined to think, that this pellucid *Lympha* transudes through the Pores of the lesser Arteries into the Cavity of the Membrane, where resting, it gradually petrifies, because the lymphatic Vessels, (as *Schenck* incontrovertibly proves*) within the Cavity of the Teeth, absorb and carry off the finer and more liquid Parts; the grosser, and such as are fitter for Induration, remaining. This forms first a solid Circumference and Superficies, and by an After-Supply of the transfused *Lympha* into the Interstices, the Solidity is in time completed; for that the osseous Parts of Teeth are engendred and nourished by a *Lympha* conveyed through Pores,

* Anan. Part. Hum. Corp. p. II. c. vi.

Pores, admits no Doubt: That Bones are nourished, we also see from Tendons and Cartilages in length of time becoming osseous, and from the tender Bones of Infants daily increasing in Size and Solidity: Lastly, the Lympha which issues from a broken Bone, is known to consolidate, so as to produce an infrangible *Callus* for soldering the Fracture. It is therefore my Opinion, that Bones not only receive an Increment till they are arrived at their due Dimensions, but continue even to old Age, to be nourished by an alimentary Lympha through the Blood Vessels; and by this Influx of the Lympha it is, that Infants Teeth coming to grow and extend themselves, force their Way through the Gums. Teeth certainly grow, else they would soon be worn out by Attrition and Manducation, as a Stone is by the continual dropping of Water; and this Growth keeps pace with their Decrease. When the Teeth come to fail or fall out, the *Mucus* brought into the empty Socket for the Nourishment of the Teeth, fills it with an osseous Substance, that the Gums being hardened, may in some measure perform the Functions of the lost Teeth.

From the Generation and Nutrition of Teeth, let us now examine from what means they derive their Sensation; for this does not belong to Teeth as osseous, it be-

ing absurd to attribute Sensation to a Substance hardly impressible ; but 'tis occasioned by the Insertion of most delicate Nerves into each Root of the Teeth, through Pores so minute as to be scarce discernible, in the Incisors and Canine, especially of an Adult, but plainer in the larger Species of Animals : These fine Nerves, together with the Blood Vessels, connected into a kind of Cord by means of a Membrane, running under the Teeth enter at their Cavities ; and from the Insertion of these very minute, but as sensible Nerves, arises the particular Sensation of the Teeth. For the provident Creator, seeing that the Teeth being liable to several Fractures, Corrosions and other Injuries, would require a more copious Aliment and Supply than the other Bones, and for a longer Term, has provided them with Nerves, that by a continual Influx of Spirits they might receive the Nourishment requisite to balance their Diminution : For the Nerves which run along both the upper and lower Jaw, and are ingrafted into the Teeth, are Ramifications from the fifth Pair, this Nerve dividing itself into several Branches, of which the chief are, an Ophthalmic, which entering the Orbit of the Eye, distributes its Fibres to the Coat of the Eye, the lachrymal Gland, the Lye-lids, to the elevatory Muscles of the Nose, and those of the Forehead ; the larger
and

and more inward Shoot of this ophthalmic Branch, entering the *Cranium* through a *Foramen* in the Orbit, near the *Crista-galli* or Cocks-comb, penetrates into the thicker *Meninges*, and leaving the *Cranium*, traverses the *Os cribriformis* into the Nose, where it is distributed over the nasal Membrane. Another Branch of the fifth maxillary Pair is seen to issue from the *Cranium* through a third *Foramen*, in several lesser Branches, of which the chief, after inserting its Shoots into the *Masseter*, the Gums, and the Roots of the Teeth of the upper Jaw, through small, but visible *Foramina*, in the hinder-part of that Jaw, runs along that *Sinus* of the Bone which forms the lower part of the Orbit, and upon its Emerision from the Aperture under the Orbit, divides itself, sometimes into three, sometimes into four Shoots, which communicate their Ramifications to the Teguments of the Face, the upper Lip, and two of the lower nasal Muscles; another Branch tending directly downwards, near the hinder Region of the maxillary Ducts, divides itself into two Canals, of which the superior bends to the *Membrana Pituitaria*, which lines the Inside of the Sinuses of the *Sphenoides*, of the *Ethmoides*, and the Frontal and Maxillary; whilst the inferior, through a *Foramen* in a Part of the Bones of the Palate, traverses a

Stratum

Stratum of a spongy Flesh under the Bones of the Palate, and, according to my Judgment, fastens its *Fibrillæ* into the fore Teeth of the upper Jaw: The third maxillary Branch, called the lower or gustatory, which emerges through a fifth *Foramen* on each side, is divided into three remarkable Shoots, the first and most inward of which, runs along under each Side of the Tongue, a little above its Root, and traverses its middle, into the maxillary Glands: The second Shoot enters the Cavity under the Bone of the lower Jaw, where its *Fibrillæ* penetrate into the Teeth, and having reached the Root of the fifth molar Tooth, proceeds through an Orifice in the forepart of that Jaw, to the Lip and its Muscles: The third Shoot of the same gustatory Branch enters into the parotid Glands, where it also terminates. The Ramification of the fifth Pair being thus known, it will be easy in the Sequel to shew, how the Teeth by *Consent* affect other Parts, and to account for the Efficacy of Medicaments applied to the Nostrils, Temples, and the hinder part of the lower Jaw, in dental Disorders.

As to the Number, Size, Figure, and Use of Teeth: They generally amount to thirty-two, a Range of sixteen being inched with the most regular Symmetry in each Mandible; though in Females they are oftener

oftener only fourteen. Nature has provided Man with two such numerous Ranges of Teeth, for the better Comminution of the Aliments, in order for Chylification. Here a Question may be moved, whether the Duration of Life be determinable from the Number of the Teeth? For it is an antient Observation of *Hippocrates*, that *they who are long-lived abound in Teeth*. *Bartholine in Instit. Anat.* p. 730. says, Few Teeth indicate both an animal Poverty and a Defect of the vegetal and formative Powers, or they are unable to give a due Preparation to the Food, whereby both the first and second Digestion are vitiated. The Teeth are many, and separated, that they might not at one and the same Time break their Inclosures, which would cause an insupportable Addition of Pain; also, that when one is disabled, it may be extracted without any Detriment to its useful Neighbours, of which Convenience we should be deprived, were the Teeth one continued Bone, and the whole Body would necessarily suffer by the Damage of a Part. The Teeth in Men are of proportionate Dimensions, and from their Figure and Functions have different Appellations, as the four forward middle Teeth are called *Incisores*, being broad and sharp, that, like a Knife, they may quickly divide and mince the Food; they are also called

Risory,

Risory, from their being shewn in laughing; likewise *Milk-Teeth*, from their coming first, when Milk is most of the Child's Food.

Next, are the *Canini*, two in each Jaw, with a broad Basis and a deep Root, and at the Extremities further from the Gum; these also are sharp, to reduce any thing which may be too hard for the *Incisores*: This Name is given them from their Resemblance to a Dog's Fangs; they are also vulgarly called *Eye-Teeth*, their Extraction causing a severe Pain to the Eyes, concerning which there is a great Diversity of Opinions. Some think that their largest Root touches the Orbit of the Eye, when in Reality they hardly reach the lowest part of the Nostrils; others say, that the Ramification of Nerves from the lower Part of the Orbit of the Eye, passing through an Orifice in the Jaw, inserts itself into these Teeth: This Opinion seems something more probable; but as this nervous Ramification does not approach the *Canini* of the lower Jaw, they cannot be properly termed *Eye-Teeth*: To these succeed the *Molares* or *Maxillary*, being five on a Side of each Range, large, scabrous, with rough broad Bases, the better to comminute what had been before cut by the *Incisores*, and attenuated by the *Canini*: Sometimes the Number of these

is only four on a Side, sometimes four on the left Side and five on the Right; sometimes the reverse, or four in the lower Range and five in the Upper; which Difference is chiefly occasioned by the last Teeth, by some particularly called the Cheek-teeth, though *Cicero* gives that Name to the Molar in general: These mostly delay their Appearance till and after the Age of Adolescence, and breed with excruciating Torture; and the Operators not considering this, either draw out other Teeth, or, fancying some peccant Humour lodged in them, ply their Patients with Anodynes and such Sort of Medicaments; when only scarifying the Gum at the last Tooth, or sometimes indeed a Pertusion of the Jaw would give the Patient immediate Ease, as I know from my own Experience, being in my Twenty-sixth Year when I cut my Thirty-second Tooth: Thus far *Vesalius de Corp. Hum. Fabrica*, Lib. i. p. 34. As to the Colour of the Teeth, the whiter the better, their Colour being a sure Sign of their Firmness; but without Care this Colour will not hold, and it is also lost by Age and Sicknefs. A Yellow or Black is preternatural, and usually proceeds from Vitiatio; in Youth, to about Thirty, the Teeth are of a glossy White, afterwards they begin to contract a yellowish Tinge, which deepens with Age, so that the juvenile White is turned to a blackish Brown; but this

D Alteration

Alteration they never undergo without some previous and preternatural Damage; and *Helmont* lays down Rules for distinguishing the Age of Teeth by their Colour. This Colour also differs according to Climates; the Southern People having clearer Teeth than the Northern, but the *Ethiopians* and *Egyptians* incomparably surpass all other Nations in this Beauty, for which they are indebted to the Clemency of the Air, and the Salubrity of the Nile; which is taken Notice of by *Helmont*, *Peter John Faber*, and by *Prosper Alpinus*, who in his Treatise on the State of Physic in *Egypt* says, *The Teeth of the Egyptians so happily retain their Beauty and Soundness, that there is no such Thing as Rottenness or Pain amongst them.*

All the Teeth stand in the Extremities of the Mandibules, firmly impacted in their Sockets or Cavities, by an Articulation called *Gomphosis*, that in the Communion of the more solid Foods, they may not be shook or loosened; though all Teeth are not fixed in their Sockets by a like Number of Roots; the *Incisores* have but one, nor have the Canine any more, but the Roots of the Canine strike far deeper than those of the *Incisores*, according to the superior Force of the Canine; and thus of the *Incisores*, the Roots of the two Middle are larger and longer than those of the two Lateral, which are contiguous

guous to the Canine. The Molar also differ in the Number of their Roots; the Upper, especially the two last, are fastened by three Roots, whereas the Lower have only two, partly because the Substance of the upper Jaw being of a softer and lighter Substance than that of the Lower, the Connection only of two Roots would be subject to Concussions, and partly because the Lower gravitate on their Roots; whereas the Upper being pendulous, stand in need of more Ligaments. Again of the other Molares nearer to the Canine, the Upper have two Roots, and one suffices for the Lower; and it must not be omitted that the Reason why Boys Teeth, the Incisores especially, when loose, are easily pulled out with the Finger-nail or a Thread, is, that their Roots are soft, having not attained their complete Solidity. It is further to be observed, that all the Roots of the several Teeth are within girded by membranous Ligaments, firmly fixing them in their Sockets; as without, they are closely locked in on all Sides by the Gums, which are a hard Substance consisting of fibrous Lays, intermixed with an infinite Number of Blood Vessels, the Causes of their deep Redness, besides membranous Glands and nervous Ramifications, which render them sensitive. There is also a continual Moisture on them; and of such Use is this Substance for

the Fixedness and Strength of the Teeth, that when it is worn away or become relax and flaccid, the Teeth loosen from their Sockets. That Membrane which invests the Roots and covered Parts of the Teeth, is rightly said by *Havers* not to be a Continuation of the maxillary *Periostrum*, but rather of that which enwraps the Gums, and is common to the whole Mouth, and is indeed glandulous, and does not terminate with the Gums, but at their Extremities, reverting within the other Side of the Gum and Teeth, inserts itself through the Socket where it adheres immediately to the Teeth. With this Membrane some of the hard and carneous Substance of the Gum is communicated to the Roots of the Teeth, as a kind of Cement for securing their Stability or Firmness within their Sockets; and though the Teeth themselves do not partake of the common *Periostrum*, yet do their Sockets, the Connection betwixt it and the Membrane which covers the Teeth, being so close and intimate that they seem but one.

Concerning the Uses of the Teeth, we have said in the Definition, that besides Mastication they were also conducive to an articulate Expression; the former, viz. cutting, grinding, and attenuating the more solid Aliments is indeed their chief Use. To this all the Teeth are requisite, and on this
Ac-

Account, their Preservation ought to be of Concern to us.

It was a particular Injunction of God in the Mosaic Law, that the Servant whose Teeth the Master had struck out should be freed. And the Ancients used to hang up a leaden Pincer in the Temple of *Apollo*, as a Document, that Teeth should never be drawn till they were so loose and decayed, that they would come out with a leaden Instrument: And, * among the *Turks*, every professed Dentist must be provided with an Imperial Licence.

The Secondary Use of Teeth is Pronunciation, by the Play of the Tongue on them, and the Repercussion of the Air. Thus Toothless Infants are capable only of crying, and with two or three Teeth, do begin to mutter; the Clearness of Expression, increasing with the Teeth, or decreasing with their Loss or Decay.

This full and, I hope, just and perspicuous Explication of the natural State of the Teeth, as to their Substances, Generation, Nutrition, Sensation, and Situation in their Sockets, clears the Way to a Discovery of their preternatural State, their Injuries, together with the mediate and immediate Causes of them.

But in order to our Design of a complete Pathology of the Teeth, it is necessary to take a Survey of the several Disorders of

* Menavius.

them

them, of those with or without Pain, and of those which are caused by a vitiated Nutriment, or the Weakness and Corruption of the Ligaments, the Nerves and the Gum. The first of these is that too common Distemper in the Substance of the Teeth, a *Caries* or *Exesion*, which is sometimes not only attended with a very sharp Pain, but with Mutilation, a putrid Stench, Worms, and *Fistulas*. This *Caries* generally arises from an inward Cause, a foul scorbutic *Lympha*, communicating to the gelatinous *Mucus* in the Cavity of the Teeth, a corrosive Acridity; whereby as Flesh, by a like noxious *Lympha*, is preyed upon and becomes ulcerous, so the Teeth by the same pernicious infected Nutriment, are debilitated, preyed upon, and at last totally destroyed. If all the Teeth are not involved in the bad Effects of a total Vitiating of the *Lympha*, this to me appears the Reason, that to this a particular Weakness of the Vessels of the Tooth, or a Disposition from some external Cause must concur; for it is from without that the *Caries* of the Teeth is usually derived, declaring itself by a small black Speck or Orifice, especially in the *Maxillary*, being broader, which in a short Time pervades through the cortical Substance, and engenders Cavities, in which Fragments of the Meat lodging, become acrid, and thus corrode and

ex-

excavate the osseous Parts of the Teeth; and as thereby a Vacuity ensues, it attracts and contains a larger Afflux of Humour; and thus the whole Tooth comes to be so wasted and destroyed, that it falls away by Pieces, which is called *Mutilation*. This to the Fore-teeth happens without any previous Excavation; the *Caries* within, like a Mine, for want of Vent, quickly splitting them into Pieces.

When the *Sanies* of a rotten Tooth, not having a sufficient Issue through the Orifice, falls upon the Roots, and Sockets, an Ulcer ensues, although this be not always occasioned by the *Caries* of the Tooth, but oftener takes its Rise in the Jaw, and terminating in the Tooth putrefies it. *Zwinger* gives an Account of a *Fistula* first caused by a *Caries* in the Tooth, and then spreading a *Caries* among several Teeth. This Excavation of the Teeth is succeeded by a most loathsome Stench, proceeding from the cadaverous *Pus* of the rotten Tooth, as this is produced by the Putrefaction of Fragments of Food lying in the Cavities; for the *Pus* of the Tooth, which is of a saline sulphureous Quality, by a violent intestine Motion, acts upon the Fragments of the Food, dissolving the close Texture of their Parts, and induces Putrefaction, which is nothing else than a Dissolution of the constituent

stituent Elements of a Body, by a violent intestine Motion; and the inseparable Attendant on Putrefaction is a Stench arising from the Evaporation of detached saline sulphureous Particles; further, in the putrefied Tooth is found a Breed of Worms, of which nothing is more productive than this putrefying intestine Motion, as actuating, vivifying, and fomenting, the vermicular *Eggs*, and by its expansive Force, in a short Time hatching these pernicious Insects. We shall not here determine the Question, whether this Breed supposes an antecedent Seminary, or whether, according to the old Notion of equivocal Generation, they can be produced from any predisposed Matter, by Means of this putrefying intestine Motion; yet, as some Illustration of this disputed Point, shall set down two curious Observations. A Professor of *Leipsick* told me some Years ago, that upon repairing a Room in the Princes College, there was found, in a rotten Beam, a Worm of a frightful Figure, and of such a monstrous Size, that it was near half the Length of the Beam itself. The second Observation is of a found intire Egg without any visible Fissure, and vermilioned over; which was laid all Summer in a Chest of Linnen; the Linnen being wanted, upon opening the Chest, a Swarm of small winged Insects flew out, leaving in the
Lin-

Linnen a most rank fower Smell, in the Bottom of the Egg was found an Aperture, which was the Out-let for these Vermine, and the Egg being broke, Swarms of Animalcules were seen nestled in the White, for the Yolk was intirely consumed. There being no Part of the human Body in which Worms may not be engendred, as *Forrest* † and others have demonstrated, I see no Reason to oppose their Breeding in the Teeth, as great Part of our Food is impregnated with the Eggs of them. This is further confirmed by Experience, Worms having actually been taken out of decayed Teeth; innumerable Instances of which are recorded in medical Treatises.

From a putredinous Nutriment, which is inherent rather in the Gums than the Teeth, is generated, what is commonly called the Tartar. *Helmont* is of Opinion that the Teeth receive their Nourishment from the Gums, which if it come to putrefy and oozing out of the Gums, it adheres to the Teeth, where it contracts a Hardness almost equal to that of the Teeth themselves. For my Part I rather think, the Tartar growing on the Teeth, to be partly produced by the Saliva known to abound in earthly viscous and tartarine Particles, and partly from a fowl tartarine *Lympha*, which issuing from the Gums

† Lib. xiv. p. 330.

on the Teeth, leaves on them viscous and tartarine Principles: This Tartar, by Reason of its Acridity, eating into the Substance of the Teeth, occasions a Blackness by multiplying and enlarging the Pores which absorb the Light, and this indicates a *Caries*. However this stony Concretion is instantly removed by rubbing it with Spirit of Salt, which shews it to consist of an alkaline Earth. This Case is very common to Children living mostly upon viscid and sugared White-meats; to those who have the Scurvy, Gout, or Gravel, and to the hypocondriacal, and, for no other Reason, than that their Serum is foul, earthy, and tartarine: Of all which I think a natural Conclusion is, that the Gums, as from them the Condition of the Serum and Lympha is determinable, are a proper Subject of the Physicians Attention.

We now come to those Disorders of the Teeth which arise from a Weakness or Defect in the Nerves; and I shall begin with that intense Pain, which sometimes is not confined to a single Tooth, but is felt in the adjoining Parts, the Gums, and even the whole Jaw. Every one skilled in Anatomy knows, that there is a very thin, but exquisitely sensitive Membrane, in the Cavities of the Teeth; and that the Gums, Sockets, and Roots, are closely girded by a nervous Tegument; and the *Pus* of a rotten Tooth
falling

falling on the membranous *Fibrillæ*, occasions that raging Pain the Tooth-ach, very seldom troubling those whose Teeth are perfectly sound; for in Cases of a Defluxion from the upper Part of the Head upon the Jaw, it meets with a kind of Reservoir in a decayed Tooth. Sometimes in the most perfect Soundness of the Teeth, there will be a Pain, attended with Redness, Swelling, a Pulsation of the Arteries, a continual Running at the Mouth, an unusual Heat and feverish Disorder of the Blood; all which are Symptoms of a kind of Gout in the Teeth, and of an Inflammation in the circumjacent Parts. To this Ailment are more especially subject Persons under a Scurvy, of a plethoric Habit, and Women in their *Menses*, or Men troubled with the *Hæmorrhoides*, unless prevented by Venesection; but none are so afflicted with it as Women in their Pregnancy, on account of the Surcharge of ill Humours which usually attends their plethoric Habit, as it proceeds from the Stagnation of the acrid Serum about the Gums, Roots, and Membranes of the Teeth, which sometimes also brings an * *Erysipelas* over the external Tegument of the Face, the Muscles under it, and the Parotid Glands; and is accompanied with the Tooth-ach and a spasmodic Contraction of the Nerves of the Teeth.

* St. Anthony's Fire.

The Antients distinguished the Causes of the Tooth-ach into hot and cold, and in this they were well grounded; the Season of the former, is Youth or Manhood, when through Effervescence of the Blood, it attacks the plethoric, the choleric, and sanguine Persons, being attended also with feverish Symptoms, Redness, and Tumour of the Vessels: The Cause is said to be Cold, when it is felt in Women, old Persons, or in cathartic, ferose, debile Constitutions, together with Paleness, a faint Pulse, and pituitous Humours; and it is in general to be observed, that the Tooth-achs proceeding from Heat are more violent, but of shorter Duration than those derived from Cold. A second Observation is, that the Tooth-ach occasioned by *Caries*, is more continual, but may be heightened by many Incidents, both external and internal; whereas that which is inflammative, and the Effect of the Stagnation of the acrid viscous Serum, and common to gouty, plethoric, rheumatic, and hypochondriacal Persons, brings with it a feverish Shaking, Heaviness in the Head, a Swelling in the Face, a Lassitude all over the Body, and comes on by Intervals and ends at certain Periods. This Ailment in its Access, Causes, Symptoms, and Cure, has some Analogy with the Erysipelas, the Gout, and Rheumatism; and inflammative Congestion of Blood

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or Serum, Heat, Redness, Tumours, Pulsations, being common to them all, and their common Cure the Diffipation of that Congeries.

Nor, on this Subject, must I omit, that Torture which Infants suffer in cutting their Teeth, especially the *Ganini*; these being both harder and sharper than the rest: This Pain is caused by the Lancination, Division, and Irritation of the Gums, and extremely acute it must be, as they consist of Fibres, Nerves, and Membranes. From this Pain, with which is always connected a violent Contraction and Disorder through the whole nervous System, proceed those dreadful Symptoms which so many suffering Creatures are seen to undergo in breeding their Teeth, as enumerated by the admirable *Senex*, *Sect. 3. Aphor. 25.* where he says, *When the Teeth begin to shoot, they occasion pungent Irritations of the Gums, Fevers, Convulsions, Diarrheas, especially when it comes to the Canini; and gross and costive Subjects suffer most; to which may be added Restlessness, Retchings, Asthma, Cough, and a Running at the Mouth; and these Symptoms are the severer, and sometimes aggravated, by Convulsions; as the Habit of the Body inclines to them either from the Womb, an unhealthy or pregnant Nurse, Milk coagulated and putrefied, hot Pap, the Admission of cold*
Air,

Air, or Worms in the Bowels. More on this Subject may be found to this Purpose in the learned *Willis* *.

The next in Order are the Cases arising from the Defect of the Nerves and Laxness of the Ligaments; and of these the first is called Vacillation. Now Teeth vacillate or become loose, either through a Defect in the Tooth itself, or in the Gum: To the first Cause pertain the Laxness, Flaccidity, Corrosion, or Rupture of the Ligaments; to the latter a Distemper in the Tone of the Gums, or a Dissolution of Parts, of which sometimes the Consequence is only an Emission of Blood, and sometimes a putrid *Epulis* or Excrecence, so as to hinder the necessary Opening of the Mouth.

Ligaments are relaxed by Narcotics, Opium, Ointment of Tobacco, &c. and by rougher Causes, as a Fall, the Opposition of a hard Body, a Blow, and all these more dangerous than before; for the *Incisores* having but one Root, and that not so deep as those of the other Teeth, are more easily shaken: As to the hurtful Opposition of a hard Body, young People experience it by striving often, out of a silly Bravadoe or Curiosity, to crack the Stones of Fruits. They are loosened by Convulsions, as in the Collision and Agacement of the Teeth, and by

* On Convulsions.

Want of due Nourishment, as in sick and aged Persons. These Ligaments or fibrous Girders are impaired and damaged by any Corrosive, whether Tartar or *Caries*, whether a scorbutic Humour or the Relics of Mercury. Thus *Eustachius* says, That from Defluxions in the Teeth he has more than once found in their Sockets gravelly Concretions; to which *Etmuller* attributes the greatest Part of the dental Tartar, and which eating through the Ligaments, at length detach the Tooth, as *Shenck* shews in his Observations on the Scurvy. The adventitious Acridity issuing from the Gums to the Roots and Ligaments of the Teeth, propagates the Corrosion; though by nothing are the Firmness, the Nerves, and Ligaments of the Teeth, so much damaged as by Mercury, which, wherever it find Pores (and its exceeding Subtility finds them in the most compact Bodies) it certainly insinuates itself, and its corrosive Effects soon appear. To this Purpose is the Observation of the noble and indefatigable *Boyle* (said to have expended above 400,000 Crowns in physical Experiments) who found a very small Particle of Mercury, the Relict of a mercurial Ointment, in the Socket of a Tooth, which it had entirely destroyed; and those cosmetic Waters, in which Mercury is an Ingredient, will certainly produce the like Effect, as

Forrest

Forreſt and *Etmuller* ſhew at large. Laſtly, the Ligaments may be broken by external Violences; and if ſome remain, they are too few to ſecure the Tooth in its Socket with any Fixedneſs. As to the Gums, their Tone may be relaxed without any Tooth-ach, as being ſwelled before by an Inflammation; for all inflamed Fleſh afterwards becomes flaccid, upon the Salivation ceasing. If the Gums were tumefied without Laceration the Rarefaction of their Parts will be attended only with an Emission of Blood; for the *Saliva*, being of an acrid Quality, whether ſimple or ſcorbutic, cauſes a ſpongiouſ Tumor in the Fleſh of the Gums, and this is ſeen to break upon the ſlighteſt Touch, and emit Blood. The Premises being known, it will be eaſy to explain both the Fall and the Deficiency of Teeth; the former is when by ſome outward Violence, or inward Weakneſs, the Tooth is detached from its Socket; the Deficiency, when new Teeth no longer grow in the Place of the former.

We now proceed to the Numbneſs of the Teeth, which cauſes a peculiar kind of Uneaſineſs, and happens when the Membrane inveſting the Teeth is in ſome Meaſure deprived of Senſe; the Cauſe of it is from ſomething of a ſour acid Nature, either eaten, or drank, or ejected; and hence
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Hypochondriacs abounding with such Humours, are most subject to this Disorder. As to the Agacement of the Teeth, or their being *set on Edge*, it is a convulsive Motion from a reciprocal Contraction of the abductory and adductory Muscles in the Cheeks; and of this the Causes are intense Cold, Pains by Worms, or difficult Tothing, or Suppression of the *Menses*. Let this at present suffice for the Pathology or preternatural State of the Teeth.

Having thus considered the various Ailments of the Teeth, and their Causes, let us now attend to the most effectual Preventives and Remedies; and here our first Regard is due to the *Caries* or sanious Corruption of the Tooth, though it must be noticed, that this *Caries* or Corruption is irremediable by any Skill or Care whatever; for there is no restoring to Soundness what is once corrupted and mortified, as is seen in a *Sphacelus* or *Gangrene*, which to the Flesh is no other than as a *Caries* to the Bones. Care may be taken however with Success, to stop the spreading of this Corrosion in its beginning, and save the Tooth from being utterly consumed, for if once a *Caries* is got into a Tooth, the Putrefaction increasing, it ravages the Part with great Rapidity, and especially if there be an Admission of Air or any heavy Fluid to act on the Violence of

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its intestine Motion, it never stops till it has made an End of and destroyed the whole Substance of the Tooth, nor does it even stop here, but pursues its Devastations from Tooth to Tooth. This shews how much they deserve our narrow Inspection and sedulous Care, to obviate any Injuries with which they are threatned. Euphorbium, Camphire, Oil of Cloves and of Scurvygrass, and other Medicaments, which are of the happiest Effect in a *Caries* of the Bones, I judge and know to avail little in the Case before us; and chiefly for this Reason, that beside the Misapplication of them, their Virtues are impaired by the Saliva and the attenuated Food. The only Remedy which I have found to answer by frequent Experience, for preserving a Tooth already excavated, or made hollow by the *Caries*, is to insert in it little Pieces of Lead, exactly shaped to fill the Cavity; and by this simple and easy Expedient I have known Teeth preserved for many Years; for thus the small Bits of our Food, which never fail to engender Putrefaction, being precluded from lodging in the Cavity, a further Corrosion and a stinking Breath, the inseparable Companion of it, are prevented: To this may be added, that the Lead, by its alkaline Quality, corrects, tempers, and even alters the acrid cadaverous Sanies: In a Word, it is a Fence against
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the Air, in this Case so very pernicious; and totally allays the ulcerous Fermentation.

A little Acquaintance with the medical Science gives us to understand, that no Pains of the Teeth are so vehement as those arising from Corrosion and Excavation; they open a free and large Passage for any acrid Humours, which irritating the nervous Membrane that lines the Cavity, cause most excruciating Pains: Therefore in order to save a carious Tooth from any such Torture, for the future, let a Cautery be applied to burn the Membrane which is the Seat of Sensation: This Operation is attended with neither Pain nor Danger, and is the best I know of; I have tried it, and always with the most desirable Success, having provided a particular Instrument for the Purpose: Afterwards a Bit of Lead, fashioned as above, must be inserted in the Cavity of the Tooth. *Forrestus* * directs to apply an *actual* Cautery through a Tube, and to secure the adjoining Teeth with Wax or some such pliable Body. *Scultetus* † gives a Description of an Instrument adapted to this Operation: Let it be here observed, that an actual Cautery is far preferable to any *potential*, such as Oil of Vitriol, *Aqua Fortis*,

* Lib. iv. p. 410.
Appendice, p. 5.

† In Armament. Chirurg.

and *Caput Mortuum* of Vitriol ; these injuring the Texture of the Teeth and Jawbone, the other drying up the noxious Moisture of the Tooth, and reducing the Fermentation ; two beneficial Effects, which justly entitle it to the Preference.

The Extraction or Drawing of the Teeth comes next under Consideration, it being sometimes of no manner of Service, sometimes dangerous, and sometimes highly necessary. It is of no Service, when, by a Concretion of foul Humours, the Inflammation and Exulceration is not confined to the Tooth or Jaw, but has over-run the neighbouring Region ; also when there appears no Defect in the Tooth, no Benefit can accrue from drawing it. As little necessary is it in a Tooth-ach proceeding from a *Caries*, because, as has been intimated, any further *Caries* or Pain may be prevented and the Tooth saved by the Application of an actual Caution ; there is Danger in drawing out the *Canini*, on account of their deep and broad Roots, to which are also annexed a Ramification of a Nerve issuing through an Aperture in the Orbit, and thus an Inflammation in the Eyes, or violent Head-achs, may be the Consequence. In the Extraction of firm Teeth there is also Danger of such an *Hemorrhage*, or Flux of Blood, especially to those of a plethoric Habit, or in the Approach

proach of the *Menses*, or to those who are afflicted with the Scurvy or Fever, as may prove fatal. Neither should a Tooth be drawn at the Time of the Head-ach, or when the Head is surcharged with Blood, or when the Body is under any excessive Pain, because in such an Irritation of Nature, the Symptoms will be greatly inflamed by the Evulsion. If an extraordinary Flux of Blood follows upon the drawing of a Tooth, it will be proper to apply the *Caput Mortuum* of Vitriol.

The Extraction of the *Molares* is particularly dangerous, especially of the second and third in the upper Jaw, not only as a larger Laceration of the Flesh is to be apprehended from their three Roots, but the Jaw-bone it self may irreparably suffer; of which the following Relation is a remarkable Instance. Not long ago I was honoured with a Visit from a Lady of great Distinction, complaining of an Ulcer in that Part of her upper Jaw, which had been filled by her second Molar Tooth drawn a Twelve-month before, and that the Vacuity not being close, she was troubled with a continual Defluxion of a serous Matter into her Mouth. This Vacuity admitted the Probe above two Inches, and upon my applying Balsam of *Peru*, or any other odoriferous Medicament, in order to its closing, she smelt it no less than if it had

had been transmitted through her Nostrils : She further observed, that when her Nose was dry, the Efflux of Matter through that Cavity augmented ; and, *vice versa*, when that Efflux decreased, the nasal Excretions were more copious. Her Rank enabled her to have her Case discussed in a Consultation of several eminent Physicians, Professors and Surgeons, who all unanimously agreed that it was an Ulcer, and accordingly recommended the hot Bath, desiccative Decoctions and Purgations, together with the outward Application of Balsams, Vulneraries, and Astringents, but to no manner of Effect. After this, the Surgeons declared for an Incision ; this they were positive would do the Business, but how they would have performed it, I was at a loss to guess. When she had gone through these Particulars and had applied to me for Relief, I immediately signified to her, that it was no Ulcer, but that by the forcible Extraction of the Tooth her upper Jaw was damaged, and the noted *Sinus* or Cavern, so accurately described by the celebrated *Higmore*, having a compact Tunic for the Secretion of the Mucus, and issuing into the Nostrils, was laid open ; and this Conjecture was verified by the Lady's own Words, *that the Root of the Tooth brought with it a Piece of something solid and very porous* ; upon which I immediately

diately shewed my illustrious Patient, in the Head of a Skeleton, the extreme Tenuity of the Socket of the second Tooth, near that Part of the Cavity with which the Tooth is connected, and how, upon such a Laceration of it, the Probe might reach so far as the Orbit of the Eye, also how it stopped at the Nostrils; therefore, concluding that a perfect Cure was impracticable, and especially as the Lady was advanced in Years, and that her Case admitted neither of any surgical Operation or any internal Medicament, I only prescribed the close Stoppage of the Cavity with Lead, that the Air, being debarred its usual free Admission, might not increase the corrosive Putrefaction; and with this plain easy Remedy, and frequently snuffing up the *Balsamum Vitæ*, she has been rid of a nauseous, troublesome, and dangerous Ailment.

Tooth-drawing in Ulcers, whether proceeding from the breaking of any tumefied Inflammation of the Gum or Jaw, occasioning a Caries, or from a decayed putrid Tooth not drawn in Time, is necessary, to give Vent to the sanious Matter. That the sanious Matter should have an Outlet is of the greatest Concern, its Acridity and Corrosiveness being increased by Stagnation. It frequently happens, that together with the Tooth the Callus is also brought away, and

a copious Flux of Blood issues from the Ulcer, whereby a complete Cure is greatly facilitated.

When Worms are engendered in a carious Tooth, it is known by a gnawing Pain with little or no Saliva. A Tooth-ach proceeding from Worms is of all others the most difficult to be cured; all the best Specifics fail here, and the only Recourse is, in those Things which are found most disagreeable and noxious to these tormenting Animalcules; and here a Decoction of Coloquintida, Pills of Aloes and Myrrh, and the Smoak of Henbane, have been recommended by some, to dislodge the Worms; but this pernicious Fumigation has been irrefragably exploded by *Hagendorne*, and the Smoak of Tamarisc will answer the End as effectually and without any Disgust or Prejudice. *Clauder*, I know, is for Extraction, but that I think should always be the last Resource, never practised but when indispensable; besides, the tartarine or tophaceous Concretion on the Teeth, cannot be better removed than by the Hand of the skilful Dentist, by Means of the curious Steel Instruments invented for this Operation; for this Tartar must be by all Means removed, as from it, Rottenness, Stench, Worms and other loathsome Circumstances arise. If its Adhesion to the Gums be not very intimate,

time, I would recommend compound Powder of Scuttle-bone, burnt Hartshorn, calcined Egg-shells, vitriolated Tartar, Florentine Orris, which will not only take off the Tartar, but give a lovely Whiteness to the Teeth; likewise Spirit of Vitriol, tempered with Syrup of Scurvy-grass and Violets, will, by Friction, remove this Concretion; but this is to be used very cautiously, lest the Corrosion reach the stony Substance of the Tooth itself.

We now come to the inflammatory Pains which the Settlement of Blood, or rather of an acrid Serum, brings on the Teeth and Jaws; and here we recommend all Medicaments in general which are found to abate Inflammations, but especially let the Extirpation of the stagnated Matter take place of every thing else, by gentle Sudorifics; and let Anodynes and Nervines be called in to assuage the Violence of the Pain; as Fevers, Insomnitude, Head-achs and Convulsions, are the too frequent Consequences of them. In a plethoric Habit, or a Suppression of the Menses, it is proper to bleed, either in the Arm or in the Tongue, by an Orifice in the ranular Veins. (*Thoner* instantly relieved a plethoric Woman in a violent Tooth-ach, by a large Incision in the Foot.) Afterwards use Diaphoretics

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mixed with Anodynes, such as *Fracastorius's* Diascordium, Syrup of Elder, Camphire, Nitre, Theriaca Cœlestis, Essence of Scordium, Elder Water, Tincture of Bezoar, Mixtura Simplex, Essence of Musk, and Cinnabar, which are to be variously administered, and continued, to promote moderate Perspirations, whereby a Fever is often prevented. Yet all strong Sudorifics are to be avoided, as by violently irritating the Blood they augment the Heat and Pain, heighten the Symptoms, and impair the Strength. For dispersing the Pain and Swelling outwardly, there is nothing better than a warm Application of little Bags of *Sal Volatile Oleosum*, Powder of Sulphur, and other Discutients, as Flowers of Camomile, Rosemary, Elder, Melilot, wild Poppey, Card. Bened. Chervil, Hyssop, Clary, Annise, Carway, Dill Seeds, Juniper Berries, Camphire, Saffron, Amber, Bean Meal, common Salt and Nitre, all which are powerful Resolutives and Discutients; besides, the Patient must be interdicted all Frigorifics, whether moist or dry. Further, if the Pain be extreme, let him towards Night take *Wildeganse's* or *Matthew's* Pill for a Basis, mixed with Purgatives and Diaphoretics, which are an excellent Opiate. I have more than once observed, in the very Paroxysm of the Agony, some
Drops

Drops of camphorated Spirit of Wine, or *Balsamum Vitæ*, snuffed up, to give Relief instantaneously, though, indeed, not of any long Duration; of which, I conjecture the Reason to be, that the Branch of the Nerve connected with the nasal Membranes, proceeds from the same Trunk, that is, the fifth Pair, as that which communicates with the Teeth. Likewise Frankincense dissolved in *Balsamum Vitæ*, and applied in Cotton to the aching Tooth, and rubbing the Gums with *Carolus's* Cephalic Water, have a very present Effect; though to ease the Agony, a Clyster is the capital Remedy. A Person of a cachochymic Habit will receive great Benefit from Purgations, Specifics of Gums, Mercurius Dulcis, Salt of Amber, Gum Guaiacum, administred in Pills for the morbid Humours.

Here a Question offers itself, Whether Cauteries or Blisters are of any Use or Benefit in Tooth-achs? Their happy Effects cannot be too highly extolled, by Practitioners, and that in the most excruciating Cases: The Application of a Cautery on the Side affected to the Anthelix or Protuberance of the Ear, or to the Muscles of the Temples, is a known and successful Expedient. Some lay Cotton on the Temples, others have substituted in its Place scraped Match. For a periodical Toothach *Spigelius* used an

actual Cautery, touching that Part of the Anthelix joining to the upper Part of the Tragus, and afterwards closing the Wound. Instead of a potential Cautery, Crow-foot, Horfe-raddish, and the like may be used specifically. A Pultice of bruised Garlic laid on the Elbow, is said to raise little Bladders and assuage the Pain. *Wolft* also relates, that having applied about the bigness of a Fig of Crow-foot, bruised and diluted with Spirit of Wine, to a fleshy Part of the Arm on the Side where the Pain lay, it had the same Effect both as to the Bladders and Relief. The Root of Leadwort or Dandelion bruised and applied to the Wrist over Night, is found to put an end to the Pain, and in the Morning to leave a lead-coloured Spot: This *Etmuller* affirms to have answered on many Occasions. No less is said of Horfe-raddish, and of other Roots impregnated with a volatile acrid Salt, applied to the Elbow. An Ointment of eight Cantharides, three Roots of Garlic and Theriaca, spread on Linen and laid on the Elbow, is also recommended as a sovereign Remedy, which has had surprising Effects in Tooth-achs; and so far I subscribe to them: That in the Tooth-ach, and especially if any acrid corrosive Serum be preying upon the Nerves, the Blister is a very proper Method, both for eliminating the
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peccant Matter, and for turning the impetuous Motion of the Spirits from the Membranes of the Teeth, into another Channel. Blisters, Antispasmodics, Nervines, and Anodynes, seldom fail of the happiest Success, being laid behind or under the Ear, the Artery entering the lower Jaw under the Ear, together with the Vein and Nerve, and running along the Roots of the whole Range of the Teeth; and by these, to the great Benefit of the Patient, the acrid Humour distilling on the Roots, is diverted and eliminated, and likewise the impetuous Motion of the Spirits in the Nerve abated: It is from this also, that the lower Jaw being compressed only with the Finger, shall instantly afford some Relief, even in a violent Agony. Besides, it is manifest from Practice, that Plaisters of Nervines and Antispasmodics, such as Mastic, Balsam of *Peru*, Extract of Castor, Camphire, Oil of Nutmeg, Saffron, and, when the Case is extreme, Oil of Henbane with Opium, applied to the Temples under the Orbit, have an instantaneous Effect; the Branch of the Nerve connected with the Muscles of the Temples, issuing from the same Trunk as the Nerves which reach along the Cavities of the Teeth; and the Nerve under the Orbit directly communicates itself to the Foreteeth of the upper Jaw.

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As difficult tootthing brings on Convulsions, Fevers and Diarrheas on Infants, let internal Antiepileptics be used, with Antispasmodics and Discutients; and mix Jelly of Hartshorn, which in this Case is highly esteemed, with their Drink, together with the Essence of wild Poppy. Though I may, without Vanity, here recommend my own mineral anodyne Liquor, a few Drops of which, frequently administred, is acknowledged from numberless Instances, to surpass the others in the Celerity and Benefits of its Operation. *Paræus* ordered the Gums to be laid open with a Penknife, and this Remedy he practised with Success upon his own Children, and in the Presence of several eminent Physicians and a Surgeon of no less Repute in his Profession. In this Incision a sharp Penknife may supply the Place of a Lancet, or is rather better. Relief has sometimes been had only by outwardly applying a Fig cut in half to the Part where the Tooth is forcing its Way, with so much Pain and Danger to the Infant, and which is visible by an Inflammation: Likewise the Pulp of Quinces with some Yolk of an Egg, dissolved in Rose-water and Syrup of Violets; or rather Hare's Brains, which Practitioners account a most admirable Specific, will produce desirable Effects.

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When the Teeth are loosened, either by Corrosion, or Corruption, or a putrid scorbutic Ulceration, or a Weakness in the Nerves, besides inward Scorbutics, which, by purifying the Blood and Lympha, strike at the very Root of the Disorder, external Applications are also to be used, for cleansing and consolidating the Gums. But, instead of any other Remedy, however cried up, I would, in a Weakness of the Teeth proceeding from an Erosion or Putrefaction in the Gums, recommend the following Liquor, of the Excellency whereof I am, from long Experience, persuaded. Take two Drachms of Mastic, Myrrh, Gum Elem; two Pugils of Germander, Clary, Sage, Myrtle Leaves; three Pugils of Leaves of damask Roses; a Drachm of Alum; half a Drachm of Clove Gillyflowers; eight Ounces of *French* Claret; an Ounce of Spirit of camphorated Wine; and an Extraction being made of these, after Filtration add Spirit of Scurvy-grass, according to the Emergency of the Case. Let this Liquor be held in the Mouth on the Jaw affected, and it will be found most surprisngly to preserve the Gums from any further Infection, to fasten the Teeth, and to renew the consumed Flesh. To the same Purpose, and with equal Effect, may be used Essence of Balsam of *Peru*, mixed with the balsamic Liquor

quor and Honey of Roses ; this Compound being also both consolidating and depurative. Sometimes the Ulceration of the Gums is such, that notwithstanding the most approved Remedies, they continue open and purulent : In this Case there should be an exact Inspection whether the Tooth under the Ulcer be not rotten, and if there be a *Caries*, to extract the Tooth, rather than not come at the Root of the Ulcer. Besides, for preserving the Teeth from Blackness, Tartar and *Caries*, and likewise for strengthening the Gums, I would advise rubbing the Teeth now and then, in a Morning fasting, with an Infusion of Sage in Wine : This should never be omitted by aged Persons whose Teeth begin to loosen, and as carefully is it to be observed by those who have a foul Breath ; both will soon feel the Advantage.

When the Teeth fail, and the dental Substance is exhausted, no medical Skill can raise a new Set, but Art has invented Ivory Teeth as an Expedient to supply the Defect of Nature ; though these serve only for Speech and Ornament, and being of no Use in Mastication, are so contrived as to be taken out in eating-time : These are fastened to each other, or to any which still may be remain in their natural Firmness, with Gold or Silver Wire, or common Thread, as *Para-*
ræus

raus * related from *Hippocrates*. *A. Benedictus* mentions † *Merulus Alexandrinus*, who, as his Teeth came out, used to fasten them with Gold Wire, for the Sake of Expression. But as for the Stories of Teeth struck out and immediately inserted, having impacted themselves as before; and that of the Lady who had a sound Tooth drawn from her Woman, with which, filling the empty Socket of her own, the adventitious Tooth took Root, neither *Paræus* nor *Et-muller* give any Credit to.

When by an Exulceration or Scurvy in the Gums, there is such a copious Hemorrhage as Physicians may apprehend to be dangerous; besides internal Diaphoretics, and other Medicaments, for correcting the Acrimony and allaying the Fermentation of the Blood, external Emollients and Conglutinants are likewise to be used. From Experience I can recommend highly rectified Spirit of Wine, Essence of Amber well saturated, or a Decoction of Pomegranate Bark, and Balustine Flowers, with Syrup of acid Pomegranates; these being all approved Styptics. But if this should not prevail against the Violence of the Hemorrhage, Recourse must be had to an Application of the *Bovist-fungus*, according to the rational Observation of *Tulpius*.

* L. ii. c. 3. † L. iii. c. 22.

Of all the Accidents which are hurtful to the Substance of the Teeth, Cold, as the most pernicious, is to be first considered; for, according to *Hippocrates*, *Cold is an Enemy to the Teeth, Nerves, Brain, and spinal Marrow*. As Cold is particularly offensive to the exsanguious and most sensible Parts, barring the free Issue of the Spirits, the Pores being contracted by a violent Motion of the Air in a direct Line, which constitutes the very Essence of Cold, I strongly advise every one, under a Pain or any Ailment of the Teeth, to abstain from cold Things, and let the afflicted Part of the Face be kept from the Air. Hence it is apparent why the Pain of a hollow Tooth is considerably abated by filling the Vacuity with Bits of Lead or Nutmeg. *Forrestus* is so cautious against admitting the Air, that he would have the Patient not to sleep with his Mouth open, to speak little, and always to use warm Water in washing his Mouth. On the other hand, all very hot Things are pernicious to the Teeth: *Hippocrates* himself says, "An excessive Heat relaxes the Flesh
 " and debilitates the Nerves; the Spirits being
 " dissipated by the Intenfeness of the Heat,
 " the Fibres of course become flaccid;" and the Strength of the Nerves, which consists in a moderate Driness, is destroyed: On which account, let all who are afflicted with
 the

the Scurvy, whose Teeth are loose, or whose Gums emit a copious Hemorrhage, carefully abstain from hot Liquids.

Secondly, all Acids, especially the corrosive, are extremely prejudicial to the Texture of the Teeth; not only as causing an Agacement, but gradually preying upon and consuming their very Substance; and Spirit of Nitre especially, is of all the most hurtful, as it is known in a short time to liquify the most solid Tooth. So that they are wretchedly mistaken who recommend the Use of such Spirits to those who are curious in the Colour of their Teeth, there being no readier way for them soon to have no Teeth at all. Likewise the drinking of any Acids, as pricked Wines or Beers, greatly contribute to bring a Caries on the Teeth or an Erosion in the Gums, by engendring a scorbutic Acrimony in the Blood or Lympha: Besides, all Preparations of Milk, Curds, Cheese, and Sugar, partly from some of their other Qualities, but especially their Viscidity, damage the Teeth; by infecting the Blood with a scorbutic Humour; and their gross Particles easily sticking to the Gums, cover them with a fetid Concretion, and thus hinders a free Transpiration; For there is no Part to which Transpiration is not necessary for Nutrition; and, from what has been said, we have a full Knowledge

ledge from whence the Teeth contract their Tartar, Blackness, Corruption, Vacillation, and Exesion. Lastly, the Teeth suffer by all sharp, salt, spicey, high-seasoned, and spirituous Eatables, being vitiated by the scorbutic acrimonious Nature of them.

Another very dreadful Enemy to the Substance of the Teeth is Mercury, whether used inwardly or outwardly ; for we see that mercurial Ointments for procuring Salivations in inveterate chronical Distempers, not only loosen and blacken the Teeth, but cause a purulent Corruption and Relaxness in the Substance of the Gums ; partly from the Corrosiveness of Mercury, rendered caustic by the Addition of Salts, and partly because relaxing the Fibres of the glandulous and nervous Parts, they fill them with noxious Defluxions. Lastly, it must not be omitted, that Opiates are also in the highest Degree detrimental to the Teeth ; for, by hindering the Influx of the corroborating Spirits, a Vacillation and Dissolution must soon be the Consequence. In an extraordinary Inflammation, Opium is not only apt to induce a Gangrene or *Sphacelus*, but even has been known indubitably to have been the Death of the Patient ; of which *Forestus* gives an Instance. To Persons advanced in Years, or of a phlegmatic Habit, Opiates are particularly dangerous, throwing them into
Stu-

Stupefactions, Lassitudes, and Vertigoes. Dentists are said to facilitate the Extraction by Henbane Seeds and Opium, which is a Reason against the Use of them, unless at an Extremity, and even then, in the most excruciating Paroxysm, it is more adviseable to administer them tempered with Purgatives, Diaphoretics and Alexipharmics, than abstractedly. Smoaking Tobacco may also be prescribed in a violent Tooth-ach, for its well known anodyne and discutient Quality, to those who are accustomed to it; yet I am far from denying, it being also a Narcotic, that the immoderate Use of it will certainly hasten the Destruction of the Teeth. To conclude, as to Dentifrics, it is a wrong Practice to use any harsh Powders, as those of calcined Flints, Pumice Stones, Corals, &c. for whitening the Teeth, as their Asperity naturally diminishes the dental Substance. If Dentifrics must be used, let them be of Crab-shells and Cuttle-bone, reduced to an impalpable Powder; and with these mix Nutmeg, Orris, Mastic, Alum, finely pulverised, and a little Musk; this both cleanses and strengthens the Teeth, and very agreeably sweetens the Breath. With such a Powder it would not be amiss to rub the Teeth after every Meal, but gently; and for this the best Method is, to take large Roots of either kind of Mallows, thoroughly cleansed,

cleansed, bruised, and dipt in Rose-Vinegar; then sprinkling some of this Powder on them, rub them against the Teeth, and this will prove a corroborative Detergent.

What I have here offered will, I hope, meet with a suitable Regard, as it tends to prevent, abate and remove, one of the most torturing Ailments, to which Mankind is subject.

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